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Studies on palearctic *Onthophagus* associated with burrows of small mammals. IV. A new Iranian species belonging to the *furciceps* group (Coleoptera, Scarabaeidae, Onthophagini)

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Abstract

Onthophagus (*Palaeonthophagus*) *psychopompus* **sp. n.** is described based on 75 specimens from Iran. The new species belongs to the *furciceps* species group, and has pholeophile habits, as the other species of the group. It appears to have a wide distribution in Iran, from 600 to 1950 m above sea level. A revised dichotomous key to the group is given.

Keywords

Scarabs, pholeophily, dens, rodents, Middle East

Introduction

At least since Falcoz (1914), it has been known that several species of *Onthophagus* Latreille, 1802, and other scarabaeoids, have a more or less exclusive association with rodents (pholeophily). Whereas burrow specialists are fairly well-known in the New

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World, they are still poorly investigated in the Palearctic. Rodents associated pholeobiont scarabs do not use dung deposited on open ground but exclusively droppings inside rodent burrows. Such dung beetle species are rarely collected outside burrows, and if so, usually under stones and most likely during their passage from one burrow to another.

During a research project undertaken by the authors on the scarabaeoid fauna of Iran associated with burrows of rodents, one of us (M. Moradi) has had the chance to collect some *Onthophagus* specimens belonging to an undescribed species.

In this paper, which is a continuation of the works by Ziani and Gudenzi (2006; 2007; 2009) on palearctic pholeophile *Onthophagus*, the new species is described.

Material and methods

75 specimens from the following collections were studied:

ABCB A. Ballerio private collection, Brescia (Italy)
ANCR A. Napolov private collection, Riga (Latvia)
EBCT E. Barbero private collection, Torino (Italy)
GCCR G. Carpaneto private collection, Rome (Italy)
LNCB L. Nádai private collection, Budapest (Hungary)
MHNG Muséum d'Histoire Naturelle, Genève (Switzerland)
TBCP T. Branco private collection, Porto (Portugal)
SZCM S. Ziani private collection, Meldola, Forlì (Italy)

Methods and terminology follow Ziani and Gudenzi (2006).

Description

***Onthophagus* (*Palaeonthophagus*) *psychopompus* sp. n.**
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Figs 1–7, 9–10

Type locality. Iran, Tehran prov.: Hashtgerd, 35°57'N, 50°40'E.

Type series. Holotype ♂: Iran, Tehran prov., Hashtgerd, 1250 m, IV.2009, M. Moradi leg. Allotype: same data as holotype. Other paratypes: 73 specimens as follows: Iran, West Azarbaijan prov., Kelisa Kandi, 1684 m, IV.2009, M. Moradi leg. 5 males and 1 female; Iran, East Azarbaijan prov., Haris, 1900 m, IV.2009, M. Moradi leg. 3 males and 1 female; Iran, Zanjan prov., Garmab, 1590 m, M. Moradi leg. 2 males and 1 female; Iran, Kordestan prov., Saqqez, 1500 m, IV.2009, M. Moradi leg. 1 male and 3 females; Iran, Qazvin prov., Sirdan, 1308 m, IV.2009, M. Moradi leg. 8 males and 3 females; Iran, Hamedan prov., Razan, 1840 m, IV.2009, M. Moradi leg. 5 males and

4 females; Iran, Kermanshah prov., Islam Abad, 1335 m, IV.2009, M. Moradi leg. 4 males; Iran, Qum prov., Dastjerd, 1680 m, IV.2009, M. Moradi leg. 2 males and 3 females; Iran, Tehran prov., Hashtgerd, 1250 m, IV.2009, M. Moradi leg. 1 male and 4 females; Iran, Ilam prov., Saleh Abad, 620 m, IV.2009, M. Moradi leg. 4 males; Iran, Chaharmahal Bakhtiari prov., Chelgard, 1950 m, IV.2009, M. Moradi leg. 4 males and 3 females; Iran, Razavi Khorasan prov., Torbat-e-Jam, 1390 m, M. Moradi leg. 1 male; Iran, Southern Khorasan prov., Birjand, 1480 m, V.2009, M. Moradi leg. 1 male; Iran, Yazd prov., Abarkooh, 1510 m, VI.2009, M. Moradi leg. 3 males and 1 female; Iran, Yazd prov., Taft, 1560 m, VI.2009, M. Moradi leg. 1 female; Iran, Kerman prov., Rafsanjan, 1510 m, VI.2009, M. Moradi leg. 1 female; Iran, Kerman prov., Ravar, 1175 m, VI.2009, M. Moradi leg. 1 male and 1 female; Iran, Sistan and Baluchestan prov., Iranshahr, 1570 m, VI.2009, M. Moradi leg. 1 female.

Type depositaries. Holotype and allotype in MHNG. Other paratypes in SZCM and in ABCB, ANCR, EBCT, GCCR, LNCB, TBCP.

Type labelling. Holotype bears three labels, as follow. 1st, white, printed in black: "IRAN-Tehran / Hashtgerd 1250m / 35° 57' N, 50° 40' E / IV.2009 M. Moradi leg."; 2nd, white, printed in black: "in burrows of *Microtus* sp. / probably *M. socialis* Pall."; 3rd, red, printed in black: "Holotype / *Onthophagus* (*Palaeonthophagus*) / *psychopompus* nobis / S. Ziani & M. Moradi, 2009".

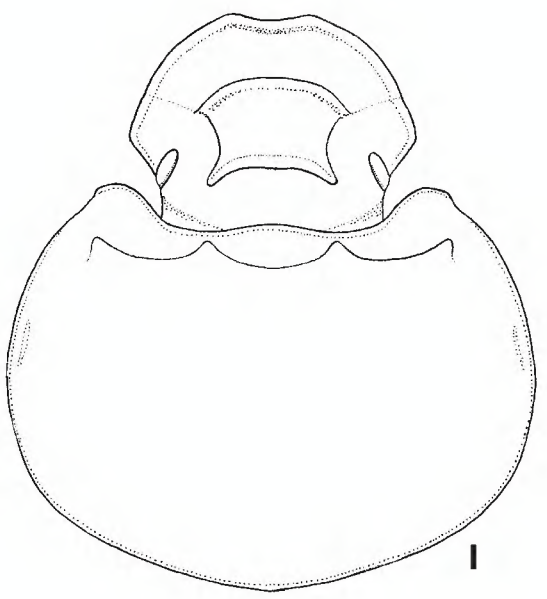
Etymology. Latinized from the classical Greek ψυχοπομπός ("*psyche*", soul and "*pompós*", guide). In the mythology, psychopomps were figures who usually escorted the souls of the dead men to the netherworld. It is here referred to the subterranean habits of the new species. The noun is in apposition.

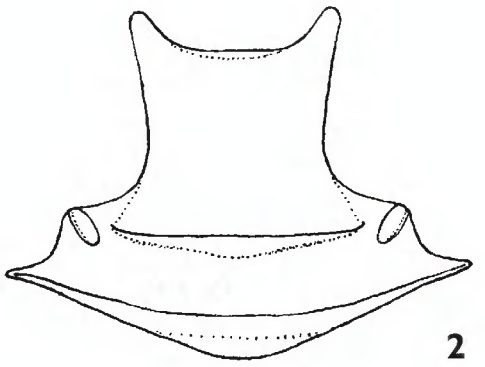
Description. Holotype. Length 8.8 mm, width 5.2. Pronotum shorter than elytra (length ratio = 0.90).

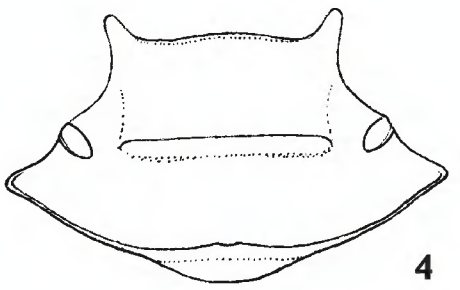
Black, dorsal side moderately shiny with a distinct isodiametric microreticulation, pubescence yellowish white, antennal scape, pedicel and funicle red, antennal club dark red.

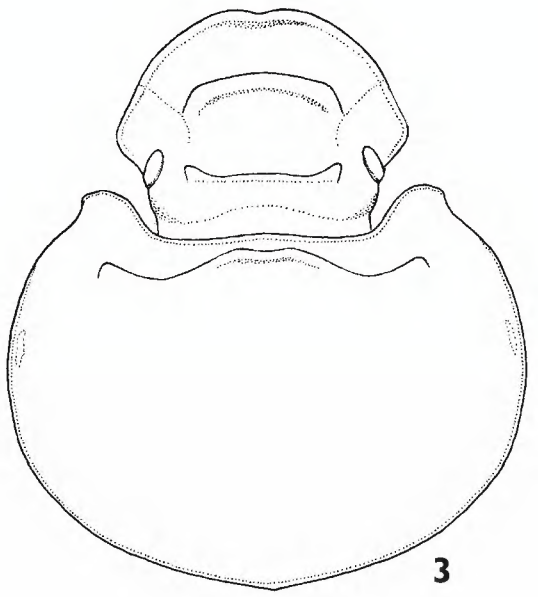
Head (Fig. 2) short, clearly wider than long (width/length ratio = 1.73), clypeus round, weakly reflexed anteriorly, only very slightly emarginate at middle, anterior angles very broadly round, sides evenly arcuate with no sinuations, genae distinctly protruding from eyes; clypeo-frontal carina distinct, strongly bent backwards, its edge in contact with a very barely traced clypeo-genal suture; occipital carina extended in a high, slender, terminally expanding and bifurcate horn, very weakly dentate at middle apically, twice as long as width of its base; clypeal and frontal surface with rather coarse setigerous punctures, more spaced on frons than on clypeus, with long erected bristles clearly thicker basally, gradually thinner apically.

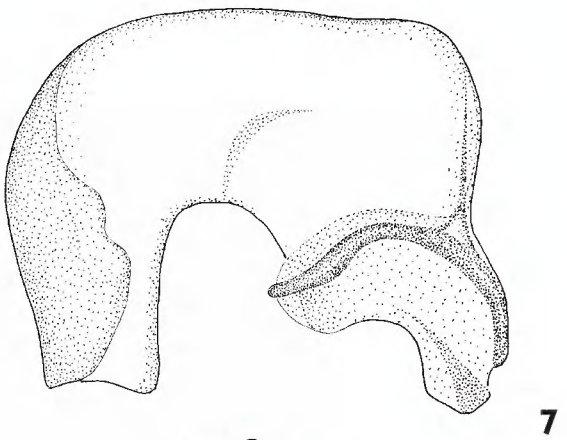
Pronotum (Fig. 1) convex, strongly declivous towards anterior edge, with four anterior, equidistant, slender and apically almost sharp tubercles, the middle two slightly more prominent and projected upwards, the two anterolateral slightly projected outwards; base margined; anterolateral angles round, subtruncate, dorsal surface with setigerous punctures, separated by half to one diameter anteriorly, gradually more spaced towards base, where punctures are separated by two to four diameters; each puncture

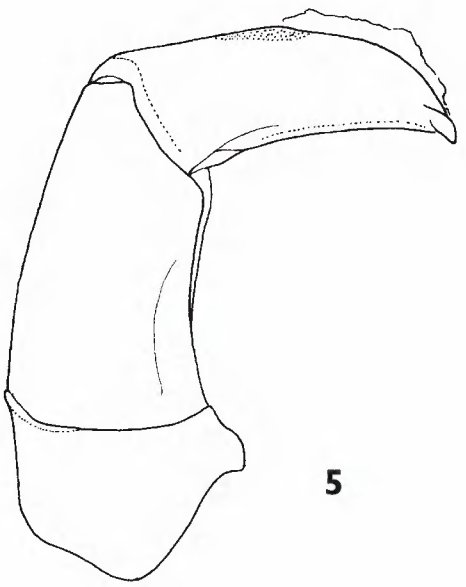


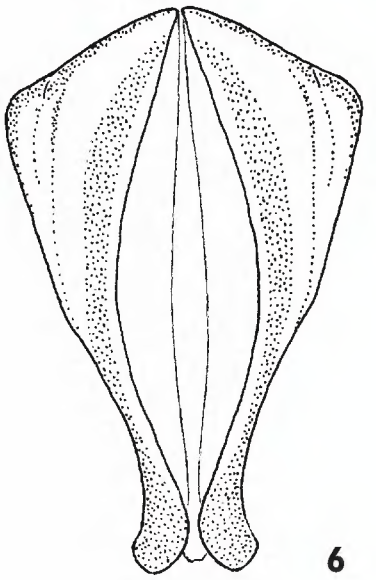












Figures 1–7. *Onthophagus* (*Paleonthophagus*) *psychopompus* sp. n. Male, holotype, and female, allotype (Iran, Hashtgerd, Tehran prov.). **1** Male: head and pronotum, dorsal view **2** Male: head, frontal view **3** Female: head and pronotum, dorsal view **4** Female: head, frontal view **5** Parameres, lateral view **6** Parameres, dorsal view **7** Lamella copulatrix, ventral side. Drawings by I. Gudenzi.

bears a small granule at its anterior margin; bristles yellowish white, moderately long, scale-shaped, usually bifid or trifid at about two thirds of their length.

Elytral striae thin, shallow, slightly shining, their punctures only barely crenating interstriae; the latter flat, granulose, granules minute, as big as strial punctures or a little smaller, each granule bearing at its base a long yellowish white bristle which is sometimes bifid or trifid, or lanceolate.

Pygidium with setigerous, large punctures, widely spaced, with long thin yellowish white hairs.

Fore tibial spur bent inwards and downwards. Fore, middle and hind femora ventrally with small, rather sparse setigerous punctures.

Male genital armature as in Figs 5–6. Lamella copulatrix as in Fig. 7.

Allotype. Length 8.9 mm, width 5.2 mm. Pronotum shorter than elytra (length ratio = 0.85).

Head (Fig. 4) short, clearly wider than long (width/length ratio = 1.75), clypeus sub-truncate, clypeo-frontal carina distinct, slightly more elevate than in male, slightly bent backwards, frontal carina with a narrow lamina ending in a pair of erect horns, margin between horns straight or slightly sinuate in frontal view.

Pronotum (Fig. 3) with distinct, male-like, anterolateral tubercle on either side, and with an anteromedian transverse sunk gibbosity, only very slightly sinuate at middle.

Variability. Length 5.8 – 9.9 mm, width 3.4 – 5.7 mm. Occipital carina is female-like in minor males. In some males, usually but not necessary minor specimens, pronotal anteromedian gibbosities are closer to each other than in most of the examined specimens. Some minor males, less than 6.0 mm long, have pronotal anteromedian tubercles joined together in a small projection, but always divided in two by a shallow depression. In one minor male (the smallest of the type series) anterolateral tubercles are only vestigial and the occipital carina is reduced to a straight transverse and very low ridge. On the other hand pronotal morphology is quite homogenous in both major or minor females. Only the occipital carina is clearly lower and straighter in minor than in major females.

Distribution. The new species appears to be widespread all over Iran (Fig. 8) from 620 to 1950 m above sea level.

Remarks. *Onthophagus psychopompus* sp. n. belongs to the subgenus *Palaeonthophagus* Zunino, 1979, and can be placed in the *furciceps* group, characterized by medium size (6.0 to 10.0 mm), black colour, the occipital carina of the head with a high slender lamina, which is expanding and bifurcate apically in major males, broader basally and more or less elevate and horned in females, pronotum with anterior angles subtruncate, with a distinct anterolateral tubercle on either side and a more or less bilobate anteromedian gibbosity, elytra with yellowish white to reddish yellow stout bristles, sometimes bifid or trifid along their length or lanceolate, and a lamella copulatrix of quadrangular shape, excluding the basal emargination (Ziani and Gudenzi, 2006). *O. psychopompus* sp. n. can be assigned to the lineage of *O. ponticus*, characterized by both pronotal and elytral bristles stout, lanceolate, always distinctly thicker basally than distally, sometimes bifid or trifid

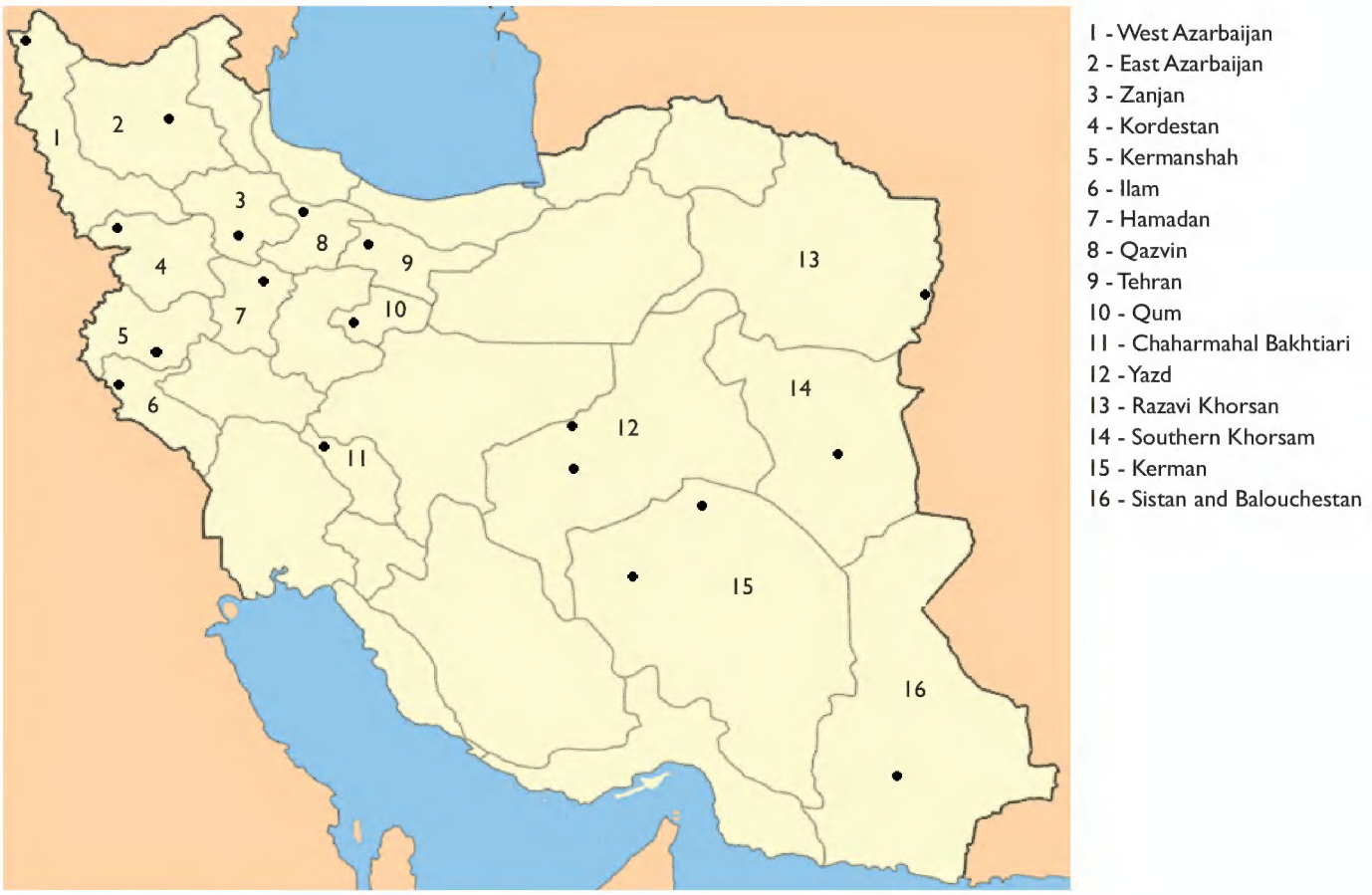


Figure 8. *Onthophagus* (*Paleonthophagus*) *psychopompus* sp. n. Distribution map.

along their length, and by the dorsal surface dull, with distinct microreticulation. The new species can be easily distinguished from the other species of the group, particularly *O. ponticus*, apparently its closest relative, by the characters given in the key to *furciceps* species group proposed by Ziani and Gudenzi, 2006, modified as follows:

Key to the *O. furciceps* species group

1. Bristles on elytral disc simple; dorsal surface shining, disc of pronotum barely or not at all microreticulate **4**
– Bristles on elytral disc bifid or trifid, or lancelolate; dorsal surface dull, with distinct microreticulation **2**
2. Lamellae of antennal club thin and elongate, much longer than in most *Onthophagus* species, somewhat resembling those of some Melolonthini ..... ***O. parmatus* Reitter, 1892**
– Lamellae of antennal club normally shaped **3**
3. Relatively small species (length 4.8–8.2 mm). Pronotum equally densely punctate on disc and basally. Male: pronotum with four tubercles, the two anteromedian very closely placed and smaller than the two anterolateral; female: pronotum with an anteromedian narrow regularly convex gibbosity .... ***O. ponticus* Harold, 1883**

– Relatively large species (length 5.8–9.9 mm). Pronotum densely punctate on disc, punctures gradually more spaced toward base. Male: pronotum with four equidistant tubercles, the two anteromedian more prominent than the two anterolateral; female: pronotum with an anteromedian transverse sunk gibbosity ..... ***O. psychopompus* sp. n.**

4. Pronotal sides obviously sinuate behind anterior angles; pronotum approximately as long as elytra..... ***O. furciceps* Marseul, 1869**

– Pronotal sides not sinuate behind anterior angles; pronotum longer than elytra..... ***O. bytinskii* Balthasar, 1960**

In Balthasar (1963), the last taxonomic monograph covering Iranian territory, *O. psychopompus* sp. n. can be inserted in the key at thesis 24 (21), p. 199, to form a couplet with *O. ponticus* from which is easily distinguished by the characters mentioned above. Moreover, the shape of the lamella copulatrix, with the right branch, in ventral view, bifurcate, is very characteristic for the new species.

Figures 9–10. *Onthophagus* (*Paleonthophagus*) *psychopompus* sp. n. Male, paratype (Iran, Sirdan, Qazvin prov.) and female, paratype (Iran, Saqqez, Kordestan prov.). **9** Dorsum of male **10** Dorsum of female. Photos by A. Ballerio, scanned by G. Fiumi.

Discussion

All the specimens of the type series were collected in burrows of rodents belonging to three genera: *Meriones* Illiger, 1811, *Microtus* Schrank, 1798 and *Allactaga* Cuvier, 1837. The rodents in the first two genera tend to inhabit both arid and grassy areas, while the genus *Allactaga* includes hopping rodents of desert and semi-arid regions. *O. psychopompus*, which appears to be a strictly pholeobiont species, is distributed almost all over the Iranian territory and is associated to rodents of at least the three mentioned genera. The new species shows a strict but generalized preference for small rodents' burrows, without host specificity or restrictions to particular soil types. Its occurrence is not associated to a narrow altitudinal range, because it was collected from a wide belt ranging from 620 to 1950 m above sea level. Probably the constant temperature inside the burrows and the regular presence of food allows this scarab to avoid less favourable conditions outside.

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